IN THE SPECIFICATION:

Page 1, between lines 2 and 3 (underneath the title), insert – Background of the Invention –;

Page 6, between lines 12 and 13 insert – Summary of the Invention –;

Revise lines 16-17 to read as follows:

– The object is solved in accordance with the invention by an interferometric apparatus described herein ~~in accordance with claim 1 and by the use claims and the method claims~~.–;

Page 7, change lines 9-12 to read as follows:

–Preferable embodiments of the invention result from the ~~dependent claims 2 to 34~~ following description ~~on from the main claim~~. Uses in accordance with the invention result from ~~claims 35 to 38~~ and a method in accordance with the invention and preferred method variants also result from the description herein ~~claims 39 to 48~~. –;

Page 8, between lines 15 and 16 insert – Description of the Preferred Embodiments –;

Revise page 14, line 18 – page 16, line 6 to read as follows:

– The Figures show preferred aspects of the invention in respectively different combinations ~~of the different claims~~.

Figure 1 shows an extremely compact arrangement ~~in accordance with claim 1~~, with the optical components being integrated in a monolithic glass block. The

light coupling (M) takes place ~~in accordance with claim 6~~ directly from a mono-mode glass fiber into the block so that the field initially develops as a spherical wave. The amplitude of the wave ~~in accordance with claim 2~~ is split by a diffraction structure (G) applied directly onto the glass block into a diffracted component and a reflected component which run to a respective one of the mirrors (S1, S2) applied directly to the glass block. The diffraction structure acts in this process [,] ~~in accordance with claim 27,~~ both as a beam splitter and as a spectrally highly dispersive optical element which changes the wavefront of the diffracted beam in a spectrally dependent manner. In the further steps, the partial fields are reflected and superimposed again. The illustrated arrangement here functions <u>as follows</u> ~~in accordance with claims 28 to 30~~. The resulting field exits the glass block via the free surface. A second field consisting of non-used diffracted portions is substantially incident to that surface of the glass body via which the coupling of the spherical wave took place. This portion should be absorbed by a suitable coating of this surface.

The detector (D) has a small spatial extent or has a suitable diaphragm and is located [,] ~~in accordance with claim 7,~~ on a moveable arm, shown with a center of motion (P). The detector is moved through the light field and records its intensity at a plurality of spatial positions sequentially. In the arrangement shown, the movement of the arm is driven with the help of an eccentric device (X), which is driven by a motor (R).

A set of such measurements, i.e. a set of measured values recorded at defined positions, forms a pattern which can be evaluated with the help of the methods ~~in accordance with claims 39-48~~.

An arrangement in accordance with Figure 2 using a separate beam splitter (S) for the division of the amplitude of the waves ~~in accordance with claim 2~~ and two dispersive elements (G1, G2) in the arms of the interferometer becomes possible by a mono-mode coupling (M) ~~in accordance with claim 4~~. An aperture diaphragm (A) as shown is advantageous. Such an arrangement manages without a Fourier transform optical system or fully without any imaging optical elements, since the translation invariance of the Fourier transformation can be omitted. The evaluation of the interference patterns, which are generated by such an arrangement, can thus also not take place directly by a numerical Fourier transformation, but requires one of the methods shown ~~in claims 39 to 48~~ herein. The arrangement shown in Figure 2 uses a spatially resolving detector (CCD) ~~in accordance with claim 9~~. A phase modulator (P) ~~in accordance with claim 14~~, for instance in the form of the piezo-actuator symbolized in the Figure, has a particularly advantageous effect. – ;

Revise page 16, line 10 – page17, line 13 to read as follows:

– In this case, the set of the intensities respectively recorded by the spatially resolving detector forms a pattern which can be evaluated with the help of the methods in accordance ~~with claims 39-48~~ the invention.

In addition to the advantages of arrangements ~~in accordance with claim 1~~, which arise from the possible full dispensing with imaging optical elements, this permits a mono-mode coupling, in particular also an interferometric arrangement,

which are based on a splitting of the wavefront ~~in accordance with claim 3~~. Beyond the omission of imaging optical elements, this also permits the omission of a beam splitter as a discrete optical element.

Figure 3 shows an arrangement in accordance with the invention ~~claims 1 and 3~~. The requirement is a coupling (M), for instance in accordance with ~~claim 4~~ a preferred embodiment. The coupled light field propagates as a spherical wave starting from M. In the arrangement shown, the mirror (S) has a suitable opening through which the coupled field can pass. A portion of the wave is incident to a diffraction grating (G1), another portion is incident to a diffraction grating (G2); the wavefront is thus split. An aperture diaphragm (A) as shown is advantageous. The gratings diffract the light with the highest possible efficiency back to the moving mirror (S), where a superimposition of the wave fields takes place.

The moving mirror ~~in accordance with claim 8~~ reflects the resulting field to the detector (D), which can record the intensity of the field at a plurality of different positions in dependence on the position of the mirror.

It is favorable, but not absolutely necessary, to provide a phase modulator ~~in accordance with claim 14,~~ for instance in the form of the piezo-actuator (P) shown.

An alternative possibility ~~in accordance with claim 15~~ for the generation of different interference patterns, which can be utilized in the methods shown can be realized in such arrangement simply by a spatial displacement of the coupling device.

In this case, the pattern to be evaluated by a method ~~in accordance with one of claims 39 to 48~~ is provided by a set of measured values which were measured for different positions of the mirror S. – ;

Revise page 18, line 17 –page 19, line 4 to read as follows:

– A highly extremely compact and cost-effective possibility to realize an arrangement in accordance with the invention is shown in Figure 4. A diffractive optical element (D) is used ~~in accordance with claim 11~~ in a function ~~in accordance with claim 27~~, in this case a diffuser with a granularity of a suitable order of magnitude. The requirement for the operation is in turn a coupling of the light field (M) in the form of only one or fewer spatial modes ~~in accordance with claims 4 to 6~~. A suitable aperture diaphragm (A) as shown is advantageous. The variant shown expediently has an image-providing detector (CCD) ~~in accordance with claim 10~~. Instead of the diffuser, depending on the application, diffractive elements ~~in accordance with claim 25~~ can be used which can generate a highly structured interference field. A variant of the Talbot effect or of the Lau effect, in particular the capability of specific structures to image themselves, can also be utilized in this context. Optionally, different interference fields can be generated by a spatial displacement of the coupling or a displacement or tilting of the diffuser ~~in accordance with claim 15~~.--

Page 19, revise lines 7-18 to read as follows:

– The selectivity of the arrangements can be improved in that parts interact a plurality of times with the light fields, in particular when the arrangement permits a plurality of reflections or forms a resonator. Figure 5 shows an arrangement in

accordance with the invention ~~in accordance with claim 16~~ having this property.

A coupling of the light field (M) ~~in accordance with one of the claims 4 to 6~~ is again required to generate recognizable interference fields. A suitable aperture diaphragm (A) as shown is advantageous. The resonator is formed ~~in accordance with claim 17~~ by the beam splitter (S) and a diffractive element (G) which simultaneously serves as a beam splitter itself over different orders of diffraction. The field is coupled via the beam splitter (S) into the resonator, the resulting interference field in the direction of the detector (CCD) is uncoupled via the diffractive element (G). Further partial beams reflected a plurality of times likewise contribute to the interference. –; and

Revise page 21, line 9- page 22, line 5 to read as follows:

– Figure 7 shows a particularly advantageous arrangement ~~in accordance with claim 30~~. The light field is coupled (M) ~~in accordance with one of the claims 4 to 6~~. The aperture diaphragm (A) bounds the solid angle to avoid scattered light.

The light field is then incident on a diffractive structure ~~in accordance with claim 27 or 28~~ (diffraction grating), preferably made as a grating or as a multiplex grating. Holographically optical elements can be used very advantageously at this point. The reflected portion of the field is incident on a mirror (S2), the diffracted portion of the field is incident on another mirror (S1). Portions of the respective partial fields are reflected back from the mirrors to the diffractive element and are there superimposed to form two interference fields by respective partial reflection and diffraction. One of these interference fields reaches the detector (CCD) ~~as described in claim 30~~. The patterns recorded by the detector can then be further

processed numerically in the manner shown. Other parts of the fields exit the arrangement unused. The actuator (phase shifter) shown at one of the mirrors (S2) permits the recording of interference patterns at different relative phase positions of the partial fields.

The arrangement shown in Figure 8 forms a particularly advantageous combination. Beyond the element for coupling the light field (M) already shown in Figure 7, an aperture diaphragm (A), mirrors (S1, S2), a diffractive element (diffraction grating) and the detector (CCD)[,] ~~in accordance with claim 31~~, an imaging optical element (L) and an exit aperture (A2) can be used. The exit aperture restricts the variability of the interference patterns, which occur. For the case that the diffractive element is a diffraction grating, the exit aperture can also restrict the wavelength range of the fields, which reach the detector. – .